What is claimed is:

1. A method for detection of a leak in a micro-machined device having a device wafer and a capping wafer, said method comprising the steps of:

(a) forming at least one reservoir on at least one of the device wafer and the capping wafer, the at least one reservoir having at least one reservoir port;

(b) forming a PN junction diode adjacent to the least one reservoir port;

(c) bonding the device wafer with the capping wafer, to form a cavity enclosing the PN junction diode; and

(d) electrically testing the PN junction diode as an indication of the presence of moisture within the cavity.

2. The method of claim 1, wherein step (a) includes forming at least one diffusion channel connecting the at least one reservoir to the at least one reservoir port, each reservoir port being positioned to be in communication with the cavity.

3. The method of claim 1, wherein step (a) includes forming the at least one reservoir port by Deep Reaction Ion Etching (DRIE) method.

4. The method of claim 1, wherein step (b) includes forming a PN junction diode in at least one of advantageous shapes comprising linear, segmented, bent, curve, oval, and circular.

5. The method of claim 2, wherein step (b) includes forming a PN junction diode to surround the at least one reservoir port.

6. The method of claim 1 further comprising the step of forcing a liquid through a gap between the bonded wafers, and retaining moisture in the at least one reservoir, prior to step (d).

7. The method of claim 1, wherein step (d) includes causing a reverse current by applying a current through the PN junction diode, and measuring voltage as an indication of the presence of moisture within the cavity.

8. The method of claim 1, wherein step (d) includes causing a reverse current by applying an electric potential across the PN junction diode, and measuring the reverse current as an indication of the presence of moisture within the cavity.

9. The method of claim 1 further comprising the step of forming a sensor element on the device wafer prior to step (c).

10. The method of claim 1, wherein bonding in step (c) is performed by a method including silicon direct bonding, anodic bonding and glass frit bonding.

11. A micro-machined device assembly comprising:

a device wafer;

a capping wafer bonded on said device wafer to at least partially define a cavity;

at least one reservoir for receiving a liquid and retaining moisture, said at least one reservoir defining at least one reservoir port in communication with said cavity;

an exposed PN junction diode disposed within said cavity, and adjacent to said at least one reservoir port; and

a pair of metal pads connected to said exposed PN junction diode.

12. The device assembly of claim 11, wherein said at least one reservoir includes at least one diffusion channel connecting said at least one reservoir to said at least one reservoir port.

13. The device assembly of claim 12 wherein said at least one reservoir and at least one diffusion channel are disposed in a sub-surface of said device wafer.

14. The device assembly of claim 11, wherein said exposed PN junction diode is enclosed within said cavity and said pair of metal pads is disposed outside said cavity.

15. The device assembly of claim 11, wherein said exposed PN junction diode is formed in at least one of advantageous shapes comprising linear, segmented, bent, curve, oval, and circular.

16. The device assembly of claim 11, wherein said exposed PN junction diode is circular, and partially surrounding said at least one reservoir port.

17. The device assembly of claim 11, wherein said PN junction diode is circular, and completely surrounding said at least one reservoir port.

18. The device assembly of claim 11, wherein said exposed PN junction diode defines a P region and an N region, and wherein one of said pair of metal pads is connected to said P region, and the other one of said pair of metal pads is connected to said N region.

19. The device assembly of claim 11 further includes at least one sensor element disposed within said cavity and connected to sensor input and output pads outside said cavity.

20. The device assembly of claim 11, wherein said wafers are made of at least one semi-conducting material.